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**Question Paper Name:** Nano Technology 31st May 2019 Shift 2  
**Subject Name:** Nano Technology  
**Creation Date:** 2019-05-30 11:32:42  
**Duration:** 120  
**Total Marks:** 120  
**Display Marks:** No  
**Share Answer Key With Delivery Engine:** Yes  
**Actual Answer Key:** Yes

## Nano Technology

**Group Number :** 1  
**Group Id :** 39090051  
**Group Maximum Duration :** 0  
**Group Minimum Duration :** 120  
**Revisit allowed for view? :** No  
**Revisit allowed for edit? :** No  
**Break time:** 0  
**Group Marks:** 120

## Nano Technology

**Section Id :** 39090095  
**Section Number :** 1  
**Section type :** Online  
**Mandatory or Optional:** Mandatory  
**Number of Questions:** 120  
**Number of Questions to be attempted:** 120  
**Section Marks:** 120  
**Display Number Panel:** Yes  
**Group All Questions:** No

**Sub-Section Number:** 1  
**Sub-Section Id:** 39090095  
**Question Shuffling Allowed :** Yes

**Question Number : 1 Question Id : 3909006001 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes**  
**Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

**The distance between the center of mass of an equilateral triangular shaped lamina of side length 'a' and the center of any side is**

**Options :**

1.  $\frac{a}{3}$

2.  $\frac{2a}{\sqrt{3}}$

3.  $\frac{\sqrt{3}a}{6}$

4.  $\frac{a}{\sqrt{3}}$

Question Number : 2 Question Id : 3909006002 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A cantilever beam of length 3 m fails when a load of 3kN is applied at the free end. If beam has cross section of 50mm x 60mm. What is the value of stress at the failure?

Options :

1. 100MPa

2. 250 MPa

3. 300 MPa

4. 420 MPa

Question Number : 3 Question Id : 3909006003 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When a body's rotation axis passes through the center of mass, the moment of inertia along that axis will be

Options :

1. maximum

2. minimum

3. zero

4. depends on shape of the body

Question Number : 4 Question Id : 3909006004 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Find the moment of inertia of rectangle having dimensions 60mm X 100mm about centroidal axis ( $I_{xx}$ )

Options :

1.  $2.4 \times 10^6 \text{ mm}^4$
2.  $5 \times 10^6 \text{ mm}^4$
3.  $6 \times 10^6 \text{ mm}^4$
4.  $7.2 \times 10^6 \text{ mm}^4$

Question Number : 5 Question Id : 3909006005 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a rigid body moving with constant acceleration, the resultant displacement is

Options :

1. Constant with time
2. Linear with time
3. Parabolic with time
4. Cubic with time.

Question Number : 6 Question Id : 3909006006 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A body initially at rest is subjected to a constant angular acceleration of  $10 \text{ rad/s}^2$ .  
The angular velocity after 10s is

Options :

1.  $10 \text{ rad/s}$
2.  $20 \text{ rad/s}$
3.  $100 \text{ rad/s}$

4. 1 rad/s

Question Number : 7 Question Id : 3909006007 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

The radius of the Mohr's circle gives the magnitude of

Options :

1. Maximum principal stress
2. Minimum principal stress
3. Maximum shear stress
4. Minimum shear stress

Question Number : 8 Question Id : 3909006008 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

For a pure hydrostatic compressive state of stress of magnitude  $p$ , the maximum shear stress is

Options :

1.  $p/3$
2.  $p$
3. 0
4.  $3p$

Question Number : 9 Question Id : 3909006009 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is NOT true for simple harmonic motion?

Options :

1. Force is proportional to displacement
2. Acceleration is 180 degrees out of phase with displacement

3. Acceleration is 90 degrees out of phase with velocity
4. Acceleration is in phase with displacement

Question Number : 10 Question Id : 3909006010 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The distance travelled by a body moving with an initial velocity of 10 m/s subjected to a deceleration of  $10 \text{ m/s}^2$  before it comes to rest is

Options :

1. 0.5 m
2. 1 m
3. 10 m
4. 5 m

Question Number : 11 Question Id : 3909006011 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the absence of external torque, the total angular momentum of a spinning object is

Options :

1. 0
2. Constant
3. variable
4. cannot be determined

Question Number : 12 Question Id : 3909006012 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Two principal tensile stresses of magnitudes 40 MPa and 20 MPa are acting at a point across two perpendicular planes. An oblique plane makes an angle of  $30^\circ$  with the major principal plane. The normal stress on the oblique plane is

Options :

1. 8.66 MPa
2. 17.32MPa
3. 35.0MPa
4. 60.0MPa

Question Number : 13 Question Id : 3909006013 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The drag or damping force on an object is usually proportional to

Options :

1. displacement
2. acceleration
3. velocity
4. mass of the object

Question Number : 14 Question Id : 3909006014 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The bending moment at the end of a simply supported beam of length 'L' subjected to a point load 'P' at the center is

Options :

1.  $PL/2$
2.  $PL^2/2$
3.  $PL/4$
4. 0

Question Number : 15 Question Id : 3909006015 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The shear force in a cantilever beam with a point load at the free end

Options :

1. increases linearly with distance from fixed end
2. decreases linearly with distance from fixed end
3. constant throughout
4. increases parabolically with distance from fixed end

Question Number : 16 Question Id : 3909006016 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In case of pure bending of a beam where the bending moment is constant throughout the beam, the shear force is

Options :

1. Constant and dependent on the magnitude of bending moment
2. zero everywhere
3. directly proportional to the bending moment
4. inversely proportional to the bending moment

Question Number : 17 Question Id : 3909006017 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Doubling the diameter of a shaft increases the power transmission by

Options :

1. 2 times
2. 4 times
3. 8 times
4. 0.25 times

Question Number : 18 Question Id : 3909006018 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a hollow shaft the maximum shear stress occurs at the

Options :

1. center
2. inner radius
3. outer radius
4. half way in between inner and outer radius

Question Number : 19 Question Id : 3909006019 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Bending stiffness of a rectangular beam of elastic modulus  $E$ , moment of inertia  $I$ , length  $L$  and cross-sectional area  $A$  is

Options :

1.  $EA/L$
2.  $EI^2$
3.  $E/I$
4.  $EI$

Question Number : 20 Question Id : 3909006020 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the ratio of mass of two bodies having equal kinetic energy is 4:1, what is the ratio of the magnitude of their linear momentum?

Options :

1. 1:1
2. 2:1
3. 4: 1
4. 1:2

Question Number : 21 Question Id : 3909006021 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the minimum principal stress for the following stress state

$$\sigma_{xx} = 10 \text{ MPa}; \sigma_{yy} = 10 \text{ MPa and } \tau_{xy} = 10 \text{ MPa}$$

Options :

1. 10 MPa
2. 20 MPa
3. 0 MPa
4. 5 MPa

Question Number : 22 Question Id : 3909006022 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a two-dimensional state of stress, the principal stresses are always

Options :

1. perpendicular to each other
2. parallel to each other
3. at 45 degrees to each other
4. at 180 degrees to each other

Question Number : 23 Question Id : 3909006023 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the absence of shear forces the flow is

Options :

1. Rotational
2. Irrotational
3. Laminar
4. turbulent

Question Number : 24 Question Id : 3909006024 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Boundary layer thickness is the distance from the wall to the point where velocity of the fluid is

Options :

1. 1 % of free-stream velocity
2. 90 % of free-stream velocity
3. 95 % of free-stream velocity
4. 99 % of free-stream velocity

Question Number : 25 Question Id : 3909006025 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The velocity profile for turbulent flow through a closed conduit is

Options :

1. parabolic
2. linear
3. logarithmic
4. hyperbolic

Question Number : 26 Question Id : 3909006026 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is true at high Reynolds number?

Options :

1. Inertial forces are significant
2. Inertial forces are not significant
3. Viscous forces are significant

4. Viscous and inertial forces are significant

Question Number : 27 Question Id : 3909006027 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For flow through a circular pipe of internal diameter 'D', the hydraulic diameter is

Options :

1.  $D/2$

2.  $D/4$

3.  $D$

4.  $4D$

Question Number : 28 Question Id : 3909006028 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Streamlines and equi-potential lines in a flow are

Options :

1. always parallel

2. sometimes parallel

3. always perpendicular

4. sometimes perpendicular

Question Number : 29 Question Id : 3909006029 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Mach number for a supersonic flow is

Options :

1. less than 1

2. greater than 1

3. equal to 0

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equal to 1

Question Number : 30 Question Id : 3909006030 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is true for speed of sound in air?

Options :

1. Increases with increase in temperature
2. Decreases with increase in temperature
3. Remains constant with change in temperature
4. does not depend on temperature

Question Number : 31 Question Id : 3909006031 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Anemometer is used to measure

Options :

1. Density
2. dynamic viscosity
3. kinematic viscosity
4. velocity

Question Number : 32 Question Id : 3909006032 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Newton's law of cooling is applicable for

Options :

1. conduction
2. convection

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3. radiation

4. convection and conduction

Question Number : 33 Question Id : 3909006033 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of momentum diffusivity to thermal diffusivity is

Options :

1. Reynolds number

2. Biot number

3. Prandtl number

4. Nusselt number

Question Number : 34 Question Id : 3909006034 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Navier stokes equation represent conservation of

Options :

1. Mass

2. momentum

3. energy

4. mass and momentum

Question Number : 35 Question Id : 3909006035 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the defect is eliminated by hot working process?

Options :

1. Cold shut

2. Misrun
3. Blow holes
4. Fusion

Question Number : 36 Question Id : 3909006036 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

The ratio of convective to conductive heat transfer is given by

Options :

1. Biot number
2. Prandtl number
3. Reynolds number
4. Nusselt number

Question Number : 37 Question Id : 3909006037 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

The rate of conductive heat transfer does not depend on

Options :

1. Thermal conductivity
2. surface area
3. temperature gradient
4. thermal expansion coefficient

Question Number : 38 Question Id : 3909006038 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Heat transfer without a medium occurs in

Options :

1. Convection

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2. Conduction

3. convection and radiation

4. radiation

Question Number : 39 Question Id : 3909006039 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The sum of absorptivity, reflectivity and transmittivity of thermal radiation is

Options :

1. 0

2. 1

3.  $< 0$

4.  $< 1$

Question Number : 40 Question Id : 3909006040 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of buoyancy to the viscous forces acting on a fluid is given by

Options :

1. Reynolds number

2. Prandtl number

3. Grashof number

4. Stanton number

Question Number : 41 Question Id : 3909006041 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Radiative heat transfer rate for a black body at a temperature  $T$  to the surroundings at temperature  $T_0$  is proportional to

Options :

1.  $T - T_0$

2.  $T^4$
3.  $(T-T_0)^4$
4.  $T^4-T_0^4$

Question Number : 42 Question Id : 3909006042 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to Buckingham theorem, for a problem with  $n$  variables with  $m$  primary dimensions, equation relating all the variables will have the following number of non-dimensional groups

Options :

1.  $n + m$
2.  $n - m$
3.  $nm$
4.  $n/m$

Question Number : 43 Question Id : 3909006043 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A heat flow diagram in which various terms of heat balance are represented by the width of the band is called

Options :

1. Sankey diagram
2. Ellingham diagram
3. Entity-relationship diagram
4. Mollier diagram

Question Number : 44 Question Id : 3909006044 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is NOT true for regenerators and recuperators?

Options :

1. Regenerators and recuperators are heat exchangers
2. Regenerators are usually smaller in size compared to an equivalent recuperators
3. Soaking pit is an example of a recuperators
4. Regenerative heating is commonly used in an open hearth furnace

Question Number : 45 Question Id : 3909006045 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The major mode(s) of heat transfer to a charge present in a salt bath furnace is

Options :

1. radiation
2. convection
3. convection and radiation
4. conduction

Question Number : 46 Question Id : 3909006046 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The least symmetric crystal system is

Options :

1. Cubic
2. Hexagonal
3. Monoclinic
4. Triclinic

Question Number : 47 Question Id : 3909006047 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The number of slip systems in FCC crystals are

Options :

1. 12
2. 48
3. 6
4. 8

Question Number : 48 Question Id : 3909006048 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Stacking fault is a ----- defect

Options :

1. point
2. line
3. planar
4. volumetric

Question Number : 49 Question Id : 3909006049 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a point defect?

Options :

1. Void
2. Vacancy
3. Interstitial
4. Frenkel defect

Question Number : 50 Question Id : 3909006050 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The family of planes representing the faces of a cubic crystal is

Options :

1.  $\{110\}$
2.  $\{111\}$
3.  $\{121\}$
4.  $\{100\}$

Question Number : 51 Question Id : 3909006051 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Plastic deformation by slip preferentially occurs

Options :

1. on close packed planes perpendicular to close packed direction
2. perpendicular to close packed planes along close packed direction
3. on close packed planes along close packed directions
4. perpendicular to close packed planes and perpendicular to close packed direction

Question Number : 52 Question Id : 3909006052 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

\_\_\_\_\_ can be used for soil quality and plant health monitoring.

Options :

1. Nano-composites
2. Nano-capsules
3. Nano-sensors
4. Nano-porous zeolites

Question Number : 53 Question Id : 3909006053 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following directions has the closed spacing of atoms in a BCC crystal?

Options :

1.  $(111)$
2.  $(100)$
3.  $(101)$
4.  $(110)$

Question Number : 54 Question Id : 3909006054 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following is a FCC metal?

Options :

1. Mo
2. Ti
3. Zn
4. Cu

Question Number : 55 Question Id : 3909006055 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is NOT true for dislocation motion?

Options :

1. Burgers vector and dislocation line are perpendicular for edge dislocation
2. Burgers vector and dislocation line are parallel for edge dislocation
3. Burgers vector and dislocation line are parallel for screw dislocation
4. Climb is a non-conservative process

Question Number : 56 Question Id : 3909006056 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following statements does NOT occur during recovery?

Options :

1. Decrease in dislocation density
2. Decrease in stored energy
3. Increase in strength
4. Increase in ductility

Question Number : 57 Question Id : 3909006057 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

As temperature increases, the yield strength of a material

Options :

1. increases
2. decreases
3. remains constant
4. initially increases then decreases

Question Number : 58 Question Id : 3909006058 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of temperature of the material to its melting point temperature in Kelvin is

Options :

1. hot working temperature
2. cold working temperature
3. homologous temperature

Question Number : 59 Question Id : 3909006059 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The linear relationship between stress and strain given by Hooke's law is valid up to

Options :

1. Elastic limit
2. yield point
3. proportional limit
4. ultimate tensile strength

Question Number : 60 Question Id : 3909006060 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following materials is more malleable?

Options :

1. Ti
2. Au
3. Mg
4. Mo

Question Number : 61 Question Id : 3909006061 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Pattern of atoms arranged in a face centered closed packing is given by

Options :

1. AAAAAA
2. ABABAB

3. ABCABC

4. AABBA

Question Number : 62 Question Id : 3909006062 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The maximum stress point in an engineering stress-strain plot is

Options :

1. fracture / breaking stress
2. ultimate tensile strength
3. upper yield stress
4. lower yield stress

Question Number : 63 Question Id : 3909006063 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The process by which a pure screw dislocation can move from one slip plane to another is

Options :

1. glide
2. nucleation
3. cross-slip
4. climb

Question Number : 64 Question Id : 3909006064 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Arrange in the ascending order of their refractive indices

Options :

1. Diamond > glass > water > kerosene

2. Diamond > glass > kerosene > water
3. Diamond > kerosene > glass > water
4. Kerosene > Diamond > glass > water

Question Number : 65 Question Id : 3909006065 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The magnitude of transverse and longitudinal elastic strains is identical in a uniaxial tension test when the Poisson's ratio is

Options :

1. 1
2. -1
3. 0.5
4. 0

Question Number : 66 Question Id : 3909006066 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following does NOT occur during cold working?

Options :

1. increase in dislocation density
2. increase in yield strength
3. increase in ductility
4. increase in hardness

Question Number : 67 Question Id : 3909006067 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Twinning is most commonly observed in which one of the following crystal structures

Options :

1. FCC
2. BCC
3. simple cubic
4. HCP

Question Number : 68 Question Id : 3909006068 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to the Hall-Petch relationship, the yield stress is

Options :

1. directly proportional to grain size
2. inversely proportional to square of the grain size
3. inversely proportional to square root of the grain size
4. inversely proportional to cube root of grain size

Question Number : 69 Question Id : 3909006069 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Hot working of metals is usually performed above

Options :

1. recrystallization temperature
2. melting temperature
3. curie temperature
4. glass transition temperature

Question Number : 70 Question Id : 3909006070 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The upper and lower yield point phenomena are observed in

Options :

1. Aluminum
2. Copper
3. Mild steel
4. Cast iron

Question Number : 71 Question Id : 3909006071 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The work done by a closed system during a reversible process is

Options :

1. always greater than that during an irreversible process
2. always lesser than that during an irreversible process
3. zero
4. depends on the entropy change during the process

Question Number : 72 Question Id : 3909006072 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Entropy change due to addition of heat to a system is

Options :

1. zero
2. positive
3. negative
4. cannot be determined

Question Number : 73 Question Id : 3909006073 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The work done during a thermodynamic process can be calculated from the area under the

Options :

1. P-T diagram
2. T-S diagram
3. H-S diagram
4. P-V diagram

Question Number : 74 Question Id : 3909006074 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The work done by the system during an isochoric process is

Options :

1. positive
2. negative
3. zero
4. dependent on entropy change

Question Number : 75 Question Id : 3909006075 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Polytropic exponent for an adiabatic process of an ideal mono-atomic gas is

Options :

1. 1.4
2. 1.66
3. 1
4. 0

Question Number : 76 Question Id : 3909006076 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Which property does not change during a reversible adiabatic process?

Options :

1. temperature
2. pressure
3. volume
4. entropy

Question Number : 77 Question Id : 3909006077 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

The ratio of the kinetic energy contained in each molecule of an ideal gas and its absolute temperature is proportional to

Options :

1. Planck's constant
2. Avogadro number
3. Boltzmann constant
4. Universal gas constant

Question Number : 78 Question Id : 3909006078 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Which one of the following is not a state function?

Options :

1. pressure
2. enthalpy
3. temperature

4. work

Question Number : 79 Question Id : 3909006079 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Work output without energy input violates which thermodynamic law

Options :

1. Zeroth
2. First
3. Second
4. Third

Question Number : 80 Question Id : 3909006080 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

Which one of the following processes is NOT part of the Carnot cycle?

Options :

1. isentropic expansion
2. reversible isothermal expansion
3. reversible isobaric compression
4. reversible adiabatic compression

Question Number : 81 Question Id : 3909006081 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical  
Correct Marks : 1 Wrong Marks : 0

The slope of the lines on an Ellingham diagram gives the change in

Options :

1. Enthalpy
2. entropy
3. temperature

4. free energy

Question Number : 82 Question Id : 3909006082 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The thermal efficiency of a heat engine with 50 kW power input and 10 kW work output is

Options :

1. 20 %

2. 80 %

3. 40 %

4. 10 %

Question Number : 83 Question Id : 3909006083 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to the Clausius theorem,

Options :

1.  $\oint \frac{dQ}{T} \leq 0$ 2.  $\oint \frac{dQ}{T} \geq 0$ 3.  $\oint \frac{dW}{T} \leq 0$ 4.  $\oint \frac{dW}{T} \geq 0$ 

Question Number : 84 Question Id : 3909006084 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following applications Navier-strokes equation can be used?

Options :

1. Automobiles

2. Ocean currents
3. Airplanes
4. Thermometer

Question Number : 85 Question Id : 3909006085 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Slope of constant pressure line in h-s plot gives

Options :

1. Specific heat of substance
2. Entropy
3. Absolute temperature
4. Temperature

Question Number : 86 Question Id : 3909006086 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Vapour pressure of a liquid depends on

Options :

1. volume
2. surface area
3. humidity
4. temperature

Question Number : 87 Question Id : 3909006087 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the specific heats of the working fluid are constant and the value of specific heat ratio is 1.4, the thermal efficiency (%) of the cycle is

Options :

1. 21
2. 40.9
3. 42.6
4. 59.7

Question Number : 88 Question Id : 3909006088 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is NOT true?

Options :

1. Temperature changes during sensible heat addition
2. Temperature remains constant during sensible heat addition
3. Phase change does not occur during sensible heat addition
4. Temperature is constant during latent heat addition

Question Number : 89 Question Id : 3909006089 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In comparison to the adiabatic flame temperature at constant volume, the adiabatic flame temperature at constant pressure is

Options :

1. higher
2. lower
3. equal
4. dependent on pressure

Question Number : 90 Question Id : 3909006090 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The number of degrees of freedom of a one component system with 3 phases is

Options :

1. 1
2. 2
3. 4
4. 0

Question Number : 91 Question Id : 3909006091 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to the Gibbs-Helmholtz equation, change in the ratio of Gibbs free energy to the absolute temperature for small changes in temperature at a constant pressure, written in terms of the enthalpy (H) and absolute temperature (T) is

Options :

1.  $-H/T^2$
2.  $-H/T$
3.  $-H/T^3$
4.  $-T^2/H$

Question Number : 92 Question Id : 3909006092 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The entropy of mixing of two species is

Options :

1. always positive
2. always negative
3. equal to zero
4. sometimes negative

Question Number : 93 Question Id : 3909006093 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the following statements related to Mohr's circle for stresses in case of plane stress:

- a. The construction is for variations of stress in a body.
- b. The radius of the circle represents the magnitude of the maximum shearing stress.
- c. The diameter represents the difference between the two principal stresses.

Which of the above statements are correct?

Options :

1. a, b and c
2. b and c only
3. a and c only
4. a and b only

Question Number : 94 Question Id : 3909006094 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The fugacity coefficient for an ideal gas

Options :

1. depends on pressure
2. depends on temperature
3. zero
4. one

Question Number : 95 Question Id : 3909006095 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which law of thermodynamics enables the definition of temperature?

Options :

1. Zeroth

2. First
3. Second
4. Third

Question Number : 96 Question Id : 3909006096 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The electrical resistivity of a wire of resistance  $R$ , length  $L$  and cross-sectional area  $A$  is

Options :

1.  $L/(RA)$
2.  $RL/A$
3.  $(RA)/L$
4.  $A/(RL)$

Question Number : 97 Question Id : 3909006097 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The SI unit of dielectric strength is

Options :

1.  $N/m^2$
2.  $N/A^2$
3.  $V/m$
4.  $C/m$

Question Number : 98 Question Id : 3909006098 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The property that relates the magnetic flux density to the magnetic field strength is

Options :

1. permittivity
2. inductance
3. capacitance
4. permeability

Question Number : 99 Question Id : 3909006099 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Piezoelectricity is the ability of a material to generate electric charge in response to

Options :

1. electric field
2. magnetic field
3. mechanical stress
4. thermal gradient

Question Number : 100 Question Id : 3909006100 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A large forbidden gap between conduction and valence band is observed in the case of

Options :

1. conductors
2. insulators
3. semiconductors
4. conductors and semiconductors

Question Number : 101 Question Id : 3909006101 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which surface will have the least emissivity?

Options :

1. Smooth glass
2. Plaster
3. Aluminum foil
4. Concrete

Question Number : 102 Question Id : 3909006102 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Example for Top Down approach is

Options :

1. Ball-Mill
2. Solution combustion
3. Sol-Gel
4. Chemical Co-precipitation

Question Number : 103 Question Id : 3909006103 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The relationship between the number of electrons ( $n$ ) and number of holes ( $p$ ) In an intrinsic semiconductor is

Options :

1.  $n > p$
2.  $n < p$
3.  $n = p$
4.  $n \gg p$

Question Number : 104 Question Id : 3909006104 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Below the critical temperature, the resistivity of a superconductor is

Options :

1. zero
2. infinite
3. undefined
4. negative

Question Number : 105 Question Id : 3909006105 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The susceptibility of a diamagnetic material is

Options :

1. very high and positive
2. very low and positive
3. zero
4. negative

Question Number : 106 Question Id : 3909006106 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Soft magnetic materials are used in

Options :

1. permanent magnets
2. speakers
3. transformer cores
4. microphones

Question Number : 107 Question Id : 3909006107 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of speed of light in vacuum to the speed of light in a medium is a measure of the following property of the media

Options :

1. Emissivity
2. Reflectivity
3. Refractive index
4. Absorptivity

Question Number : 108 Question Id : 3909006108 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The working principle of fiber optic cables is based on

Options :

1. Rayleigh scattering
2. refraction
3. total internal reflection
4. diffraction

Question Number : 109 Question Id : 3909006109 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The energy carried by a photon is related to its frequency through

Options :

1. Boltzmann constant
2. Planck's constant
3. Avogadro number
4. Faraday constant

Question Number : 110 Question Id : 3909006110 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Light Emitting Diodes are made of

Options :

1. Si
2. Ge
3. GaAs
4. W

Question Number : 111 Question Id : 3909006111 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Solar cells cannot be made of

Options :

1. Si
2. Ge
3. GaAs
4. Cu

Question Number : 112 Question Id : 3909006112 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following is a thermosetting polymer?

Options :

1. polystyrene
2. polyethylene
3. phenol formaldehyde
4. polypropylene

Question Number : 113 Question Id : 3909006113 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

**Cross linking of polymers**

Options :

1. significantly decreases glass transition temperature
2. mildly decreases glass transition temperature
3. increases glass transition temperature
4. does not affect glass transition temperature

Question Number : 114 Question Id : 3909006114 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

**Below the glass transition temperature, a polymer is usually**

Options :

1. soft
2. ductile
3. brittle
4. rubbery

Question Number : 115 Question Id : 3909006115 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

**Which one of the following is not a typical property of ceramics?**

Options :

1. high hardness
2. high ductility
3. high wear resistance
4. high oxidation resistance

Question Number : 116 Question Id : 3909006116 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The temperature range \_\_\_\_ is maintained in Laser ablation technique

Options :

1. 500 –1000°C
2. 500 –1100°C
3. 500 – 1200°C
4. 500 –1500°C

Question Number : 117 Question Id : 3909006117 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

\_\_\_\_\_ nano-particles attached to short segments of DNA can be used to detect the genetic sequence of a sample.

Options :

1. Gold nano-particles
2. Silver nano-particles
3. Copper nano-particles
4. Cobalt nano-particles

Question Number : 118 Question Id : 3909006118 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The major component in soda lime glass is

Options :

1. Na
2. CaO
3. SiO<sub>2</sub>

4.  $\text{Na}_2\text{CO}_3$

Question Number : 119 Question Id : 3909006119 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following is NOT a typical property of carbon nano tubes?

Options :

1. high elastic modulus
2. high tensile strength
3. high thermal conductivity
4. high density

Question Number : 120 Question Id : 3909006120 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following statements is incorrect for nano-material synthesis?

Options :

1. Top -down approach is used in large scale production
2. Bottom-up approach is used in large scale production
3. Top-down approach is usually more expensive
4. Bottom-up approach has greater control over the processing